

Program Announcements (PA'S)

RESEARCH ON MUSCULOSKELETAL FITNESS AND SPORTS MEDICINE

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National Institute of Arthritis and Musculoskeletal and Skin Diseases

PURPOSE

The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) invites investigator-initiated research grant applications to study a broad range of basic and clinical topics related to musculoskeletal fitness and sports medicine. Support will be through individual research and career development grants.

BACKGROUND

Sports activities and fitness programs are very popular. More than 30 million young Americans participate in organized competitive sports, and one of every two adult Americans exercises regularly. This emphasis on activity has led to an improvement in physical fitness and an increase in activity-related injuries. Past research efforts have yielded many improvements in training athletes, preventing injuries and treating patients. However, further significant advances could be made with additional research to study basic and applied aspects of musculoskeletal exercise, training and sports-related injuries.

The magnitude of the sports injury problem is substantial, extending beyond sports into its impact on the workforce. It has been estimated that 17 million persons in this country sustain significant injury from sports or recreational participation yearly. Each year there are one million football injuries among high school participants and 200,000 ski injuries requiring treatment. One-third of the 15 million joggers will sustain an injury which involves the musculoskeletal system. It is clear that understanding the causes, prevention, and treatment of athletic and recreational injury is a major health issue.

Many of the advances in sports medicine have been of a technological nature. For example, a substantial improvement in the evaluation and treatment of sports-related joint injuries has been the development of arthroscopes. This device allows rapid visualization and repair of the interior of many injured joints.

There has not been a strong scientific research basis to support many of the currently recommended practices in this field. For example, while a strong

scientific understanding of the normal physiology of muscle exists, there is not a large base of research into muscle metabolism, hypertrophy and injury during exercises, disuse, and strength training. Another example is the empirical design of many protective devices that are not founded in fundamental biomechanical studies.

Improved knowledge can be gained through increased basic science research related to sports medicine as well as in applying the information gained to practical problems in this field.

OBJECTIVES This solicitation is intended to stimulate research that provides a new and expanded foundation of basic science knowledge related to musculoskeletal fitness and sports medicine. Additionally, it is intended to encourage applications of the best available scientific information in important clinical aspects related to training, prevention, treatment and rehabilitation.

SCOPE

A wide range of basic and applied research is desired in various aspects of musculoskeletal fitness. No order or priority of areas of interest has been established. Applicants are encouraged to submit high scientific quality research projects in any area related to the broad objectives of this announcement.

Examples of investigations of interest to the NIAMS include but are not limited to research on:

- 1 Muscle Pathophysiology - Studies on the metabolic, structural and protein changes occurring in muscles (and muscle-tendon junctions) during exercise, disuse, and strength training. Investigations of the damage and healing of muscle tissue from factors such as mechanical or thermal overloading or systemic biochemical changes. Develop a mechanistic understanding of the growth and maturation of muscle. Explore the interrelationships and molecular steps between mechanical stimuli and biochemical changes.
- 2 Epidemiology - Define the incidence and natural history of injury in competitive sports and recreational activities. Establish risk factors for incurring injuries and for the progression of an injury to a more serious medical problem. Determine if chronic and acute injuries are interrelated.
- 3 Clinical Studies - Provide improved repair and replacement of injured muscle, connective tissues and joints. Advancements in materials and methods for transplantation, augmentation, and replacement of ligaments and tendons. Common sports injuries and symptoms include ligaments of the knee (such as anterior cruciate ligaments and medial collateral ligaments), patellar pain, and

rotator cuff syndrome. Enhanced understanding of non-surgical methods to treat rehabilitation as it relates to sports injuries.

4 Junctional Assessment - Establish simple, quantitative measures of joint motion and forces that may be uniformly applied at most research and clinical sites. Document the utilization of such evaluations for improved pre-injury screening and post-injury surveillance.

5 Injury Mechanisms - Determine the mechanical forces and biochemical environments that weaken and injure connective tissues. Establish the forces and force distributions within joint structures and tissues, both during normal function and during trauma. Establish the conditions present during competitive sports and recreational activities that may lead to damaged tissue. Compare overuse versus traumatic injuries. Investigate the role of neuromuscular control in injuries.

6 Healing - Improved general understanding of the natural healing process for muscle and connective tissue. Determine what interventions are most successful in enhancing healing and under what conditions should these therapies be applied. Establish the role of inflammation in healing and subsequent injury. Investigate healing from micro tissue damage as a preliminary step in strengthening and/or enlarging muscle and other connective tissue.

7 Prevention and Training - Develop improved protective sporting equipment and training methods, especially for high risk competitive and recreational activities. Determine the short and long range benefits and side-effects from using anabolic steroids. Establish more completely the interrelations between neuromuscular and connective tissue response to training.

General Considerations - A large research effort is required to establish a firm scientific foundation for a basic and applied program in musculoskeletal fitness and sports medicine. Improved knowledge is desired in several aspects of musculoskeletal fitness and injury: performing the activity, training and prevention, treatment, and rehabilitation. Research in these areas may be performed on various types of individuals, such as young children, adolescents, mature adults, aged, professional athletes, men or women. Because the appropriate fitness information may be different for each type of individual as they experience different possible phases of musculoskeletal fitness or injury, research should be carefully directed to the results applied to a particular combination.

APPLICATION AND REVIEW PROCEDURES

Applications in response to this announcement will be reviewed in accordance with the usual Public Health Service peer review procedures for research grants (Study Section). Review criteria include the significance and originality of the

research goals and approaches; feasibility of the research and adequacy of the experimental design; training, research competence, and dedication of the investigator(s); adequacy of available facilities; provision for the humane care of animals; and appropriateness of the requested budget relative to the work proposed. Funding decisions will be based on Initial Review Group and National Institute of Arthritis and Musculoskeletal and Skin Diseases Advisory Council recommendations. Applications should be submitted on form PHS-398, available in the business or grants office at most academic or research institutions, or from the Division of Research Grants, National Institutes of Health. Applications will be accepted in accordance with the dates for new applications on an indefinite basis:

February 1, June 1, October 1

The phrase "RESPONSE TO NIAMS PROGRAM ANNOUNCEMENT: RESEARCH ON MUSCULOSKELETAL FITNESS AND SPORTS MEDICINE" should be typed on line 2 of the face page of the application. The original and six copies should be sent or delivered to:

Grant Application Receipt Office Division of Research Grants Westwood
Building, Room 240 National Institutes of Health Bethesda, Maryland
20892-4500

For further information, investigators are encouraged to contact the following individuals:

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This program is described in the Catalog of Federal Domestic Assistance No. 13.846, Arthritis, Musculoskeletal and Skin Diseases Research. Awards will be made under the authority of the Public Health Service Act, Title III, Section 301 (Public Law 78-410, as amended; 42 USC 241) and administered under PHS grant policies and Federal Regulations 42 CFR Part 52 and 45 CFR

Part 74. This program is not subject to the intergovernmental review requirements of Executive Order 12372 or Health Systems Agency review.